

Project Code and Title

B.02.02.01.01. Data Acquisition System Design Maintenance and Improvement

Project Objective

To improve instrumentation and data collection, accuracy, and quality assurance at crash and component test facilities. To advance crash testing measurement technology for test data collected under the agency auspices.

Background

Since 1978, the agency has collected data from vehicle, component and biomechanics tests performed under NHTSA auspices. Analyses of these data form a basis for directing NHTSA research efforts and have been the bases of various NHTSA published reports. As such, ensuring the availability, correctness, and accuracy of such data is paramount and essential to carry out NHTSA research, to perform the compliance testing under the various safety standards, such as FMVSS 208, 214, 301, etc., and to perform market incentive programs testing such as NCAP.

Problem Definition

To date, a substantial recurring problem has been verifying the correctness, quality, and integrity of data received from contractor test facilities. Also, with new biomechanical test devices being introduced, the capabilities of the testing facilities are being exceeded. In addition, some of the instrumentation and procedures are becoming outdated yet technologies and industry practices have advanced significantly. The proposed tasks address and upgrade performance requirements of data collection practices at the various test facilities. In conjunction, software and hardware tools will be implemented to ensure the quality and integrity of test data and thus conformance to agency contract requirement.

Research Approach

The research approach under this project will: (1) identify current and estimate future agency requirements in data acquisition including sensors, film/video collection and test procedures, (2) review current facilities capabilities, (3) survey industry practices in crash testing measurements and procedures, (4) develop standardized test and calibration procedures, (5) specify format and quality requirements for test and film/video data verification and quality control, and (7) implement software and hardware tools to assure conformance to agency requirements. Currently tasks 1 through 7 are identified.

Potential Impact/Application

All safety standards supported by analyses of crash/sled/component test data.

Key Milestones

- ▶ Signal Waveform Generator (SWG) system upgrade
- ▶ Crash film/video collection evaluation procedure
- ▶ Crash film/Video analysis upgrade
- ▶ Generic accelerometer specification

RESOURCE REQUIREMENTS	FY 96	FY 97	FY 98	FY 99	FY
Contract Money (\$K)	90	475	475	475	

Project Manager(s)

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Completion Date

This data acquisition support project is ongoing.

Keywords: data acquisition, instrumentation, crash testing, film, film, sensor, data accuracy, data quality, signal waveform generator, transducer

Project Tasks

<u>Task</u>	<u>Title and Description</u>
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Task 1	Data Acquisition System Survey
Task 2	Performance Evaluation of Instrumentation and Data Acquisition Systems
Task 3	Signal Waveform Generator Certification, Maintenance & Upgrade
Task 4	Crashworthiness Film/Video Analysis Upgrade
Task 5	Crash Film/Video collection Evaluation Procedure
Task 6	Implement new sensors
Task 7	Generic Sensor Specification

Task	Start Date	Projected Completion Date	Status/Responsibility
1	3/92	4/93	Limited scope survey at active crash sites to identify problem areas in data acquisition systems (DAS)
2		ongoing	Evaluate site conformance to agency requirements per SAE J211 & ISO 6478
3	91	ongoing	For upgrade: Development of PC-based hardware complete, beta testing at cash sites is planned
4	10/93	10/95	Hardware developed: PC system, digitizer, video grabber board, & a CCD camera. Software developed: film digitizing
5	10/93	ongoing	Recommendations for improving image quality as well as a procedure for calibration and quality control of video recording systems developed 12/94. Procedure being beta tested at three sites. Evaluation of software for computation of distortion index is planned.
6		ongoing	Currently, QRS angular velocity sensor under evaluation
7	5/94	ongoing	Dummy based accelerometer performance specifications under development